



UNITED STATES PATENT AND TRADEMARK OFFICE

MW

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/877,906	06/09/2001	Hyeon-Seag Kim	M-11121 US	1914
25700	7590	11/20/2003	EXAMINER	
FARJAMI & FARJAMI LLP 16148 SAND CANYON IRVINE, CA 92618			OWENS, DOUGLAS W	
			ART UNIT	PAPER NUMBER
			2811	

DATE MAILED: 11/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/877,906

Applicant(s)

KIM, HYEON-SEAG

Examiner

Douglas W Owens

Art Unit

2811

MW

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-9, 11-13 and 20-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 11-13 and 21-28 is/are allowed.
- 6) ☒ Claim(s) 4, 7 and 20 is/are rejected.
- 7) ☒ Claim(s) 2, 3, 5, 6, 8 and 9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 12, 2003 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 20, 4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over US patent No. 4,466,172 to Batra in view of admitted prior art.

Regarding claim 20, Batra teaches a semiconductor device (Fig. 18a, for example) formed on a substrate (22) and comprising:

a channel region (between the source and drain) of a first conductivity type (Col. 5, lines 3 – 5);

a dielectric layer (32) over the channel region;

a diffusion barrier layer (34; Col. 5, lines 54 – 58) directly overlying and in contact with the dielectric layer;

Art Unit: 2811

a gate electrode (38) directly overlying and in contact with the diffusion barrier layer, said gate electrode comprising a semiconductor material (Col. 6, lines 51 – 54);
a blocking layer (46, 48) overlying the gate electrode; and
two source/drain regions (42,44) on opposite sides of the channel regions.

Batra does not teach a well or source/drain regions of second conductivity type. Admitted prior art teaches that conventional MOSFETs are formed in a p-well or an n-well ([0001], [0002]). It would have been obvious to one of ordinary skill in the art to incorporate the well region and source/drain regions having the second conductivity type taught in the admitted prior art, since it is desirable to form a complete transistor. With respect to the source/drain regions being of the second conductivity type, this is a requirement of the commonly used n-channel MOSFET. Although Batra is silent with respect to the type of MOSFET, the disclosure of Batra is sufficiently enabling for one of ordinary skill in the art to form an n-channel MOSFET or a p-channel MOSFET.

Regarding claim 4, Batra teaches a device, wherein the diffusion barrier layer and the blocking layer comprise silicon (Col. 5, lines 54 – 58; Col. 6, lines 33 – 36; Col. 6, lines 48 – 51 and Col. 5, lines 54 – 58).

Regarding claim 7, Batra does not teach a dielectric layer comprising oxides of zircon, titanium, tantalum or hafnium. Admitted prior art teaches a dielectric layer comprising a high-k layer ([0001]). Admitted prior art does not teach that the high-k layer comprises an oxide of zircon, titanium, tantalum or hafnium. The cited metal oxides are each known high-k dielectrics. It would have been obvious to one of ordinary skill in the art to incorporate the conventional high-k dielectric into the device taught by

Art Unit: 2811

Batra since it is desirable to minimize the art recognized problem of forming ultra thin silicon oxide layers. The high-k gate insulator results in a gate dielectric that is effectively thinner than is currently possible with silicon oxide. Additionally, it would have been obvious to one of ordinary skill in to utilize a known material that is well suited for the intended use.

Allowable Subject Matter

4. Claims 11 – 13, and 21 – 28 are allowed.
5. Claims 2, 3, 5, 6, 8 and 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

6. Applicant's arguments with respect to claims 2 – 9 and 20 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas W Owens whose telephone number is 703-308-6167. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C Lee can be reached on 703-308-1690. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722.

Art Unit: 2811

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

DWO



EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800